



PATENT

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**TRANSMITTAL OF ENGLISH LANGUAGE TRANSLATION  
OF PRIORITY APPLICATION**

Commissioner for Patents  
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Sir:

Applicants submit herewith an English language translation of the Japanese priority application, Japanese Patent Application No. 2000-356803, for the United States patent application identified above. A claim to priority was filed on November 20, 2001.

In the event any fees are required, please charge our Deposit Account No. 111833.

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[Title of the document] Specification	1
[Title of the document] Abstract	1

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[Title of the document] Specification

[Title of the invention] Polyester composition and connector

[Claims]

[Claim 1] A polyester composition, characterized in that (b) a glycidyl ester compound, (c) a glycidyl ether compound, and (d) a catalyst are melt-kneaded with (a) a polyester.

[Claim 2] A polyester composition, according to claim 1, wherein 1 to 100 parts by weight of (e) an impact resistance improving material are melt-kneaded with 100 parts by weight of said polyester (a).

[Claim 3] A polyester composition, according to claim 1 or 2, wherein 1 to 100 parts by weight of (f) a filler are melt-kneaded with 100 parts of said polyester (a).

[Claim 4] A polyester composition, according to any one of claims 1 through 3, wherein the carboxyl end group concentration in the polyester composition is 5 eq/t or less.

[Claim 5] A polyester composition, according to any one of claims 1 through 4, wherein said glycidyl ester compound (b) is a compound having one glycidyl group in the molecule.

[Claim 6] A polyester composition, according to any one of claims 1 through 5, wherein said glycidyl ether compound (c) is a compound having one or two glycidyl groups in the molecule.

[Claim 7] A polyester composition, according to any one of claims 1 through 6, wherein said polyester is a polymer, copolymer or mixture obtained with an aromatic dicarboxylic acid or any of its ester-forming derivatives, and 1,4-butanediol as main ingredients by means of condensation reaction.

[Claim 8] A connector made from the polyester composition as set forth in any one of claims 1 through 7.

[Detailed description of the invention]

[0001]

[Technical field to which the invention pertains]

The present invention relates to a polyester composition excellent in hydrolysis resistance and furthermore small in the gas generation and viscosity change during melting.

[0002]

[Prior art]

Polyesters, above all, polybutylene terephthalate (hereinafter abbreviated as PBT) is widely used as a material to be molded into various articles like parts such as connectors, relays and switches of motor vehicles and electric and electronic apparatuses.

[0003]

However, PBT has a problem in hydrolysis resistance. It is considered that the hydrolysis resistance of PBT greatly depends on the carboxyl end group concentration, and to realize the hydrolysis resistance sufficiently usable even in serve environments such as high-temperature high-humidity atmosphere, PBT with a low carboxyl end group concentration is demanded.

[0004]

With regard to this matter, various methods are being examined. For example, proposed are a method of adding a phenyl glycidyl ether compound as described in JP44-27911B, a method of adding a monoglycidyl ester compound as described in JP57-87452A, a method of adding a glycidyl ester compound and a glycidyl ether compound as described in JP58-52344A, etc. However, they have such problems that hydrolysis resistance is insufficient, and that the viscosity increases during melting. Furthermore, JP63-47804B, JP3-287657A, JP5-222279A, JP7-47685B, etc. respectively describe a method of adding an epoxy compound and further adding an additive functioning

as a catalyst. However, if an epoxy compound and a specific catalyst are merely combined as described in JP63-47804B and JP3-287657A, a sufficient effect cannot be obtained. If a single specific epoxy compound is used while a catalyst is merely added as described in JP5-222279A and JP7-47685B, the carboxyl end group concentration decreases while the hydrolysis resistance improves, but the effects are insufficient. Furthermore, during processing or use, a large amount of a gas is generated, or when a molded article is treated for hydrolysis, such problems as bleeding out occur. So, no satisfactory method is obtained yet.

[0005]

[Problems to be solved by the invention]

This invention has been achieved as a result of examining the issue of solving the above-mentioned problems of the prior art.

[0006]

Therefore, the object of this invention is to provide a polyester composition excellent in hydrolysis resistance and furthermore small in the gas generation and viscosity change during melting.

[0007]

[Means for solving the problems]

To achieve the above-mentioned object, the polyester composition of this invention is characterized in that (b) a glycidyl ester compound, (c) a glycidyl ether compound, and (d) a catalyst are melt-kneaded with (a) a polyester. This can provide a polyester composition excellent in hydrolysis resistance and furthermore small in the gas generation and viscosity change during melting.

[0008]

In the polyester composition of this invention, all of the

following are preferred conditions: 1 to 100 parts by weight of (e) an impact resistance improving material are melt-kneaded with 100 parts by weight of said polyester (a); 1 to 100 parts by weight of (f) a filler are melt-kneaded with 100 parts by weight of said polyester (a); the carboxyl end group concentration in the polyester composition is 5 eq/t or less; said glycidyl ester compound (b) is a compound having one glycidyl group in the molecule; said glycidyl ether compound (c) is a compound having one or two glycidyl groups in the molecule; and said polyester is a polymer, copolymer or mixture obtained with a dicarboxylic acid or any of its ester-forming derivatives and 1,4-butanediol as main ingredients by means of condensation reaction.

[0009]

Moreover, this invention provides a connector made from said polyester composition.

[0010]

The exhibition of effects in this invention is not clear. However, it is considered that since the glycidyl ester compound (b) and the glycidyl ether compound (c) different in such natures as reactivity with the carboxyl end groups are used together while the catalyst (d) is further used together, not only the reactivity of the polyester (a) with already existing carboxyl groups but also the reactivity with the carboxyl end groups newly produced by hydrolysis remarkably inhibit the increase of carboxyl end group concentration.

[0011]

[Modes for carrying out the invention]

This invention is described below in detail.

[0012]

The polyester (a) used in this invention is a polymer,

copolymer or mixture obtained with a dicarboxylic acid (or any of its ester-forming derivatives) and a diol (or any of its ester-forming derivatives) as main ingredients by means of condensation reaction.

[0013]

As the dicarboxylic acid used as an ingredient, enumerated are aromatic carboxylic acids such as terephthalic acid, isophthalic acid, phthalic acid, 2,6-naphthalenedicarboxylic acid, 1,5-naphthalenedicarboxylic acid, bis(p-carboxyphenyl)methane, anthracenedicarboxylic acid, 4,4'-diphenyletherdicarboxylic acid, and 5-sodiumsulfoisophthalic acid, aliphatic dicarboxylic acids such as adipic acid, sebacic acid, azelaic acid, and dodecanedioic acid, alicyclic dicarboxylic acids such as 1,3-cyclohexanedicarboxylic acid, their ester-forming derivatives, etc. Furthermore, as the diol used as another ingredient, enumerated are aliphatic glycols with 2 to 20 carbon atoms such as ethylene glycol, propylene glycol, 1,4-butanediol, neopentyl glycol, 1,5-pentanediol, 1,6-hexanediol, decamethylene glycol, cyclohexanedimethanol, and cyclohexanediol, or long-chain glycols with a molecular weight of 400 to 6000 such as polyethylene glycol, poly-1,3-propylene glycol, and polytetramethylene glycol, their ester-forming derivatives, etc.

[0014]

Preferred examples of the polymer or copolymer include polyethylene terephthalate, polypropylene terephthalate, polybutylene terephthalate, polyethylene naphthalate, polybutylene naphthalate, polycyclohexylene dimethylene terephthalate, and polyethylene-1,2-bis(phenoxy)ethane-4,4'-dicarboxylate, etc., and further, polyethylene isophthalate/terephthalate,



polybutylene terephthalate/isophthalate, polybutylene terephthalate/adipate, polybutylene terephthalate/sebacate, polybutylene terephthalate/decanedicarboxylate, polyethylene terephthalate/adipate, polyethylene terephthalate/5-sodiumsulfoisophthalate, polybutylene terephthalate/5-sodiumsulfoisophthalate, etc. One or two or more of them can be used. Among them, in view of the moldability of the polyester composition, preferred are polyethylene terephthalate, polypropylene terephthalate, polybutylene terephthalate, polyethylene naphthalate, polybutylene naphthalate, polycyclohexylene dimethylene terephthalate, polybutylene terephthalate/adipate, polybutylene terephthalate/decanedicarboxylate, polyethylene terephthalate/adipate, etc. More preferred is polybutylene terephthalate.

[0015]

As the polyester (a) used, it is preferred that the intrinsic viscosity of 0.5% orthochlorophenol solution measured at 25°C is in a range from 0.5 to 1.5 dl/g.

[0016]

The glycidyl ester compound (b) used in this invention refers to a compound having an esterified glycidyl group. As particular examples of it, enumerated are benzoic acid glycidyl ester, p-toluic acid glycidyl ester, cyclohexanecarboxylic acid glycidyl ester, stearic acid glycidyl ester, lauric acid glycidyl ester, palmitic acid glycidyl ester, versatic acid glycidyl ester, oleic acid glycidyl ester, linoleic acid glycidyl ester, linolenic acid glycidyl ester, terephthalic acid diglycidyl ester, isophthalic acid diglycidyl ester, phthalic acid diglycidyl ester, naphthalenedicarboxylic acid diglycidyl ester, bibenzoic acid

diglycidyl ester, methylterephthalic acid diglycidyl ester, hexahydrophthalic acid diglycidyl ester, tetrahydrophthalic acid diglycidyl ester, cyclohexanedicarboxylic acid diglycidyl ester, adipic acid diglycidyl ester, succinic acid diglycidyl ester, sebacic acid diglycidyl ester, dodecanedioic acid diglycidyl ester, octadecanedicarboxylic acid diglycidyl ester, trimellitic acid triglycidyl ester, pyromellitic acid tetraglycidyl ester, etc. One or two or more of them can be used. Among them, in view of melt viscosity stability, it is preferred to use a compound having one glycidyl group in the molecule, for example, benzoic acid glycidyl ester or versatic acid glycidyl ester, etc.

[0017]

It is preferred that the added amount of the glycidyl ester compound (b) is 0.1 to 3 parts by weight per 100 parts by weight of the polyester. A more preferred amount is 0.1 to 2 parts by weight, and furthermore the most preferred amount is 0.3 to 1.5 parts by weight.

[0018]

The glycidyl ether compound (c) used in this invention refers to a compound having an etherified group(s). As particular examples of it, enumerated are butyl glycidyl ether, stearyl glycidyl ether, allyl glycidyl ether, phenyl glycidyl ether, o-phenyl phenyl glycidyl ether, ethylene oxide lauryl alcohol glycidyl ether, ethylene oxide phenyl glycidyl ether, ethylene glycol diglycidyl ether, polyethylene glycol diglycidyl ether, propylene glycol diglycidyl ether, polypropylene glycol diglycidyl ether, neopentyl glycol diglycidyl ether, polytetramethylene glycol diglycidyl ether, cyclohexane dimethanol diglycidyl ether, glycerol triglycidyl ether, trimethylolpropane triglycidyl ether, pentaerythritol polyglycidyl ether, bisphenol A diglycidyl ether

type epoxy resins, bisphenol F diglycidyl ether type epoxy resins, and bisphenol S diglycidyl ether type epoxy resins respectively obtained from a bisphenol such as 2,2-bis-(4-hydroxyphenyl)propane, 2,2-bis-(4-hydroxyphenyl)methane or bis(4-hydroxyphenyl)sulfone, and epichlorohydrin by means of condensation reaction, etc. One or two or more of them can be used. Above all, in view of melt viscosity stability, a compound having one or two glycidyl groups in the molecule, for example, phenyl glycidyl ether or bisphenol A diglycidyl ether type epoxy resin, etc. is more preferred.

[0019]

It is preferred that the added amount of the glycidyl ether compound (c) is 0.1 to 5 parts by weight per 100 parts by weight of the polyester. A more preferred amount is 0.5 to 3 parts by weight, and furthermore the most preferred amount is 1.0 to 2.5 parts by weight.

[0020]

The catalyst (d) used in this invention refers to a compound having an effect of promoting the reaction between the glycidyl groups and the carboxyl end groups of the polyester (a). As particular examples of it, enumerated are alkali metal compounds such as sodium hydroxide, potassium hydroxide, lithium hydroxide, cesium hydroxide, sodium hydrogencarbonate, potassium hydrogencarbonate, sodium carbonate, potassium carbonate, lithium carbonate, sodium acetate, potassium acetate, lithium acetate, sodium stearate, potassium stearate, lithium stearate, sodium borohydride, lithium borohydride, phenylated boron sodium, sodium benzoate, potassium benzoate, lithium benzoate, disodium hydrogenphosphate, dipotassium hydrogenphosphate, dilithium hydrogenphosphate, disodium salt of bisphenol A, dipotassium salt of bisphenol A, dilithium salt of bisphenol A, sodium salt of phenol,

potassium salt of phenol, lithium salt of phenol, and cesium salt of phenol, alkaline earth metal compounds such as calcium hydroxide, barium hydroxide, magnesium hydroxide, strontium hydroxide, calcium hydrogencarbonate, barium carbonate, magnesium carbonate, strontium carbonate, calcium acetate, barium acetate, magnesium acetate, strontium acetate, calcium stearate, magnesium stearate, and strontium stearate, tertiary amines such as triethylamine, tributylamine, trihexylamine, triamylamine, triethanolamine, dimethylaminoethanol, triethylenediamine, dimethylphenylamine, dimethylbenzylamine, 2-(dimethylaminomethyl)phenol, dimethylaniline, pyridine, picoline, and 1,8-diazabicyclo(5,4,0)undecene-7, imidazole compounds such as 2-methylimidazole, 2-ethylimidazole, 2-isopropylimidazole, 2-ethyl-4-methylimidazole, and 4-phenyl-2-methylimidazole, quaternary ammonium salts such as tetramethylammonium chloride, tetraethylammonium chloride, tetrabutylammonium bromide, trimethylbenzylammonium chloride, triethylbenzylammonium chloride, tripropylbenzylammonium chloride, and N-methylpyridinium chloride, phosphine compounds such as trimethylphosphine, triethylphosphine, tributylphosphine, and trioctylphosphine, phosphonium salts such as tetramethylphosphonium bromide, tetrabutylphosphonium bromide, tetraphenylphosphonium bromide, ethyltriphenylphosphonium bromide, and triphenylbenzylphosphonium bromide, phosphoric esters such as trimethyl phosphate, triethyl phosphate, tributyl phosphate, trioctyl phosphate, tributoxyethyl phosphate, triphenyl phosphate, tricresyl phosphate, trixylenyl phosphate, cresylphenyl phosphate, octyldiphenyl phosphate, tri(p-hydroxy)phenyl phosphate, and tri(p-methoxy)phenyl phosphate, organic acids such as oxalic acid, p-toluenesulfonic

acid, dinonylnaphthalenedisulfonic acid, and dodecylbenzenesulfonic acid, Lewis acids such as boron trifluoride, aluminum tetrachloride, titanium tetrachloride, and tin tetrachloride. One or two or more of them can be used. Above all, alkali metal compounds, alkaline earth metal compounds and phosphoric esters can be preferably used. Especially, organic salts of alkali metals or alkaline earth metals can be preferably used. Especially preferred compounds are sodium stearate, potassium stearate, calcium stearate, magnesium stearate, sodium benzoate, sodium acetate, potassium acetate, calcium acetate, and magnesium acetate.

[0021]

The added amount of the catalyst (d) is not especially limited. It is preferred that the amount is 0.001 to 1 part by weight per 100 parts by weight of the polyester. A more preferred amount is 0.01 to 0.1 part by weight, and furthermore the most preferred amount is 0.03 to 0.1 part by weight. If the amount of the catalyst is less than 0.001 part by weight, the improvement of hydrolysis resistance is insufficient, and if the amount is more than 1 part by weight on the contrary, the decline of physical properties due to side reaction and the like is not negligible.

[0022]

In this invention, to impart mechanical strength and other properties to the polyester composition, an impact resistance improving material (e) can be used. As the impact resistance improving material (3), a publicly known material for polyesters can be used. As examples of it, enumerated are natural rubber, polyethylene such as low density polyethylene or high density polyethylene, polypropylene, impact resistance improving polystyrene, polybutadiene, styrene-butadiene copolymer,

ethylene-propylene copolymer, ethylene-methyl acrylate copolymer, ethylene-ethyl acrylate copolymer, ethylene-vinyl acetate copolymer, ethylene-glycidyl methacrylate copolymer, polyethylene terephthalate-poly(tetramethylene oxide)glycol block copolymer, polyethylene terephthalate/isophthalate-poly(tetramethylene oxide)glycol block copolymer, etc. One or two or more of them can be used.

[0023]

The added amount of the impact resistance improving material (e) is 0.1 to 100 parts by weight, especially preferably 1 to 50 parts by weight per 100 parts by weight of the polyester.

[0024]

In this invention, to impart mechanical strength and other properties to the polyester composition, a filler (f) can be used. The kind of the filler is not especially limited, but a fibrous, tabular, powdery, granular or other filler can be used. Particularly, enumerated are fibrous and whisker fillers such as glass fibers, metallic fibers like PAN-based and pitch-based carbon fibers, stainless steel fibers, aluminum fibers, and brass fibers, organic fibers like aromatic polyamide fibers, gypsum fibers, ceramic fibers, asbestos fibers, zirconia fibers, alumina filers, silica fibers, titanium oxide fibers, silicon carbide fibers, rock wool, potassium titanate whiskers, barium titanate whiskers, aluminum borate whiskers, and silicon nitride whiskers, powdery, granular and tabular fillers such as mica, talc, kaolin, silica, calcium carbonate, glass beads, glass flakes, glass microballoons, clay, molybdenum disulfide, wollastonite, montmorillonite, titanium oxide, zinc oxide, calcium polyphosphate, and graphite. Above all, glass fibers are preferred. The glass fibers are not especially limited in kind, if they are generally used for

reinforcing resins. For example, they can be selected for use from long-fiber type and short-fiber type chopped strands, milled fibers, etc. Furthermore, as the above-mentioned filler (f), two or more kinds can also be used together. Moreover, the above-mentioned filler (f) can also be treated with a publicly known coupling agent (e.g., silane-based coupling agent, titanium-based coupling agent, etc.) or any other surface treating agent on its surface, before it is used. Still furthermore, the glass fibers can also be covered or bundled with a thermoplastic resin such as ethylene/vinyl acetate copolymer or a thermosetting resin such as an epoxy resin.

[0025]

The added amount of the filler (f) is 0.1 to 100 parts by weight, especially preferably 1 to 50 parts by weight per 100 parts by weight of the polyester.

[0026]

To the polyester composition of this invention, one or two or more ordinary additives, for example, a flame retarder, nucleating agent, ultraviolet light absorber, thermal stabilizer, lubricant, releasing agent and coloring matter including a dye and pigment can be added to such an extent that the object of this invention is not impaired. Furthermore, a small amount of another thermoplastic resin (e.g., polyamide, polyacetal, polycarbonate, etc.) or a thermosetting resin (e.g., phenol resin, melamine resin, silicone resin, etc.) can also be contained.

The production method of this invention is not especially limited. Preferred methods include: the polyester (a), the glycidyl ester compound (b), the glycidyl ether compound (c) and the catalyst and, as required, other additives are dry-blended at a temperature higher than the melting point of the polyester (a), and the mixture is melt-kneaded using an extruder; an extruder

having two charging ports is used, and the polyester (a), the glycidyl ester compound (b) and the catalyst (d) and, as required, other additives are fed from the primary charging port provided on the root side of the screw, while the glycidyl ether compound (c) is fed from the secondary charging port provided between the primary charging port and the tip of the extruder, for melt kneading; and so on.

[0027]

The obtained composition can be molded by any publicly known ordinary and arbitrary method such as injection molding or extrusion molding.

[0028]

As a first factor for achieving the hydrolysis resistance in the polyester composition of this invention, it is considered important to use the catalyst (d) together with the glycidyl ester compound (b) and the glycidyl ether compound (c) different in such natures as reactivity with carboxyl end groups, for decreasing the carboxyl end groups already existing in the polyester (a) by reaction. From this point of view, it is preferred that the carboxyl end group concentration in the polyester composition after melt kneading is as low as possible, and it is especially preferred that the concentration is 5 eq/t or less. Furthermore, as a second factor for achieving the hydrolysis resistance, it is considered important to inhibit the increase of carboxyl end groups by also letting the carboxyl end groups newly produced by hydrolysis react. Owing to these two factors, this invention has been achieved.

[0029]

The polyester composition obtained by the method of this invention can be widely used as a material to be molded into motor vehicle parts, electric and electronic apparatus parts and the like,



since the polyester composition is excellent in hydrolysis resistance and furthermore small in the gas generation and viscosity change during melting. The polyester composition is especially suitable for connectors of motor vehicles and connectors of electric and electronic apparatuses.

[0030]

[Examples]

This invention is described below particularly in reference to examples. The respective properties were measured according to the following methods.

(1) Amount of gas generation

Melt-mixed pellets were weighed and allowed to stand in a hot air dryer at 260°C for 30 minutes. Then, the mixture was taken out of the dryer and weighed, to determine the decrement as the amount of gas generation.

(2) Mechanical properties

Injection-molded ASTM No. 1 dumbbell specimens were used to measure the tensile strength at yield point and the tensile strength at fracture according to ASTM D-638.

(3) Evaluation of hydrolysis resistance

Prepared specimens were allowed to stand in a pressure cooker tester at 121°C and 100% RH for 200 hours. Then, they were taken out to measure the tensile strength at yield point and the tensile strength at fracture according to the above-mentioned method (2).

[0031]

To measure the carboxyl end group concentration, a specimen was dissolved in o-cresol/chloroform solvent, and ethanolic potassium hydroxide was used for titration.

(4) Evaluation of melt viscosity stability

According to ASTM D-1238, a melt indexer was used to measure

the melt flow rate (MFR) at 250°C at a load of 1 kg five minutes later and twenty minutes later.

[0032]

[Examples 1 to 7 and Comparative Examples 1 to 11]

A glycidyl ester compound, glycidyl ether compound, other epoxy compound and catalyst were dry-blended at the rates shown in Table 1 with 100 parts by weight of PBT with an intrinsic viscosity of 0.82 dl/g and with a carboxyl end group concentration of 36 eq/t, and the mixture was melt-mixed and pelletized using a 30 mm diameter double screw extruder set at 250°C.

[0033]

The obtained pellets were molded into ASTM No. 1 dumbbell specimens at a mold temperature of 80°C, using a screw in-line type injection molding machine set at 250°C.

[0034]

Table 1 shows the measured results of the gas generation amounts, melt viscosity stability, mechanical properties and hydrolysis resistance of respective samples.

[0035]

[Table 1]

[Table 1]

		Composition										Amount of gas generation	MFR			Tensile strength at yield point		Carboxyl end group concentration		
		Glycidyl ester compound		Glycidyl ether compound		Other epoxy compound		Catalyst		Amount (parts)	Kind		Amount (parts)	5 min	20 min	Before treatment	After treatment	Holding rate	Before treatment	After treatment
Kind	Amount (parts)	Kind	Amount (parts)	Kind	Amount (parts)	Kind	Amount (parts)	Kind	Amount (parts)	wt%	g/10min	g/10min	MPa	MPa	%	eq/t	eq/t			
Example	1	a-1	0.3	b-1	2.2	-	-	d-1	0.05	0.05	0.05	26	22	55	52	5	5	21		
	2	a-2	0.5	b-2	2.0	-	-	d-1	0.05	0.05	0.05	29	25	55	53	4	4	19		
	3	a-2	0.5	b-1	2.0	-	-	d-1	0.05	0.05	0.06	31	33	55	52	4	4	20		
	4	a-2	1.0	b-1	1.5	-	-	d-1	0.05	0.05	0.06	32	35	54	50	3	3	18		
	5	a-2	1.5	b-1	1.0	-	-	d-1	0.05	0.05	0.07	31	35	54	49	2	2	21		
	6	a-2	1.5	b-1	1.0	-	-	d-2	0.05	0.05	0.07	31	36	54	48	2	2	28		
	7	a-3	1.0	b-1	1.5	-	-	d-1	0.05	0.05	0.06	31	36	54	50	3	3	20		
Comparative Example	1*	-	-	-	-	-	-	-	-	-	0.03	30	40	53	10	40	450			
	2	a-2	1.0	-	-	-	-	-	-	-	0.06	30	40	53	11	14	211			
	3	a-2	1.0	-	-	-	-	d-1	0.05	0.05	0.05	30	40	53	12	23	10	170		
	4	a-2	3.0	-	-	-	-	d-1	0.05	0.05	0.10	31	40	53	18	34	1	70		
	5	-	-	b-1	1.5	-	-	-	-	-	0.05	30	36	54	13	24	26	277		
	6	-	-	b-1	1.5	-	-	d-1	0.05	0.05	0.04	30	27	54	14	26	18	184		
	7	-	-	b-1	3.0	-	-	d-1	0.05	0.05	0.06	30	24	55	19	35	10	86		
	8	-	-	-	-	c-1	1.5	d-1	0.05	0.05	0.13	30	23	54	18	33	11	96		
	9	a-2	1.0	b-1	1.5	-	-	-	-	-	0.07	31	39	54	25	46	6	62		
	10	a-2	1.0	-	-	c-1	1.5	d-1	0.05	0.05	0.15	30	35	54	39	72	2	32		
	11	-	-	b-1	1.0	c-1	1.5	d-1	0.05	0.05	0.14	30	20	55	20	36	10	90		

Note: In the \* marked example, the composition was directly injection-molded without being melt-mixed and pelletized.

a-1: Terephthalic acid diglycidyl ester

a-2: Benzoic acid glycidyl ester

a-3: Versatic acid glycidyl ester

b-1: Bisphenol A diglycidyl ether type epoxy resin

b-2: Pentaerythritol polyglycidyl ether

c-1: 3,4-epoxycyclohexylmethyl-3,4-epoxycyclohexyl carboxylate

d-1: Sodium stearate

d-2: Triphenyl phosphate

[0036]

As can be seen from the results of Table 1, the polyester compositions of this invention were excellent in hydrolysis resistance and furthermore small in the gas generation and viscosity change during melting.

[0037]

[Examples 8 to 14 and Comparative Examples 12 to 22]

The same compositions as stated in Table 1 except that 200 parts by weight of glass fibers and 5 parts by weight of ethylene-ethyl acrylate copolymer were added to 100 parts by weight of PBT with an intrinsic viscosity of 0.82 dl/g and with a carboxyl end group concentration of 36 eq/t, were extruded, molded and evaluated according to the same methods as in Example 1. The results of them are shown in Table 2.

[0038]

[Table 2]

[Table 2]

	Composition										Amount of gas generation	MFR		Tensile strength at yield point		Holding rate		Carboxyl end group concentration	
	Glycidyl ester compound		Glycidyl ether compound		Other epoxy compound		Catalyst		wt%	MPa	MPa	5 min	20 min	Before treatment	After treatment	%	Before treatment	After treatment	Eq/t
	Kind	Amount (parts)	Kind	Amount (parts)	Kind	Amount (parts)	Kind	Amount (parts)											
Example	8	a-1	0.3	b-1	2.2	-	-	-	0.06	100	65	9	7	100	65	65	4	4	20
	9	a-2	0.5	b-2	2.0	-	-	-	0.05	100	66	10	6	100	66	66	2	2	18
	10	a-2	0.5	b-1	2.0	-	-	-	0.06	100	60	11	12	100	60	60	2	2	19
	11	a-2	1.0	b-1	1.5	-	-	-	0.06	99	58	11	13	99	58	59	2	2	17
	12	a-2	1.5	b-1	1.0	-	-	-	0.07	99	57	11	14	99	57	58	1	1	21
	13	a-2	1.5	b-1	1.0	-	-	-	0.08	99	44	11	13	99	44	44	1	1	29
	14	a-3	1.0	b-1	1.5	-	-	-	0.07	99	50	11	13	99	50	51	2	2	19
	12	-	-	-	-	-	-	-	0.03	98	15	10	13	98	15	15	37	37	445
	13	a-2	1.0	-	-	-	-	-	0.06	98	16	10	13	98	16	16	13	13	205
	14	a-2	1.0	-	-	-	-	-	0.05	98	16	10	13	98	16	16	9	9	166
Comparative Example	15	a-2	3.0	-	-	-	-	-	0.10	98	17	11	13	98	17	17	0	0	65
	16	-	-	b-1	1.5	-	-	-	0.05	99	16	10	12	99	16	16	24	24	262
	17	-	-	b-1	1.5	-	-	-	0.04	99	17	10	8	99	17	17	17	17	178
	18	-	-	b-1	3.0	-	-	-	0.07	100	20	10	6	100	20	20	9	9	85
	19	-	-	-	-	c-1	1.5	0.05	0.14	99	18	10	6	99	18	18	10	10	97
	20	a-2	1.0	b-1	1.5	-	-	-	0.07	99	32	11	13	99	32	32	4	4	60
	21	a-2	1.0	-	-	c-1	1.5	0.05	0.15	99	38	10	13	99	38	38	1	1	32
	22	-	-	b-1	1.0	c-1	1.5	0.05	0.14	100	19	10	5	100	19	19	10	10	88

a-1: Terephthalic acid diglycidyl ester  
 a-2: Benzoic acid glycidyl ester  
 a-3: Versatic acid glycidyl ester  
 b-1: Bisphenol A diglycidyl ether type epoxy resin  
 b-2: Pentaerythritol polyglycidyl ether  
 c-1: 3,4-epoxycyclohexylmethyl-3,4-epoxycyclohexyl carboxylate  
 d-1: Sodium stearate  
 d-2: Triphenyl phosphate

[0039]

As can be seen from the results of Table 2, also when glass fibers and ethylene-ethyl acrylate copolymer were added, the polyester compositions of this invention were excellent in hydrolysis resistance and furthermore small in the gas generation and viscosity change during melting.

[0040]

[Effects of the invention]

As described above, since the polyester composition of this invention is excellent in hydrolysis resistance and furthermore small in the gas generation and viscosity change during melting, it is useful as connectors for motor vehicles, connectors for electric and electronic apparatuses., etc.

[Title of the document] Abstract

[Abstract]

[Problem to be solved] To provide a polyester composition excellent in hydrolysis resistance and furthermore small in the gas generation and viscosity change during melting.

[Solution] Characterized in that (c) a glycidyl ester compound, (c) a glycidyl ether compound, and (d) a catalyst are melt-kneaded with a polyester.

[Selected drawing] Nil